PFU
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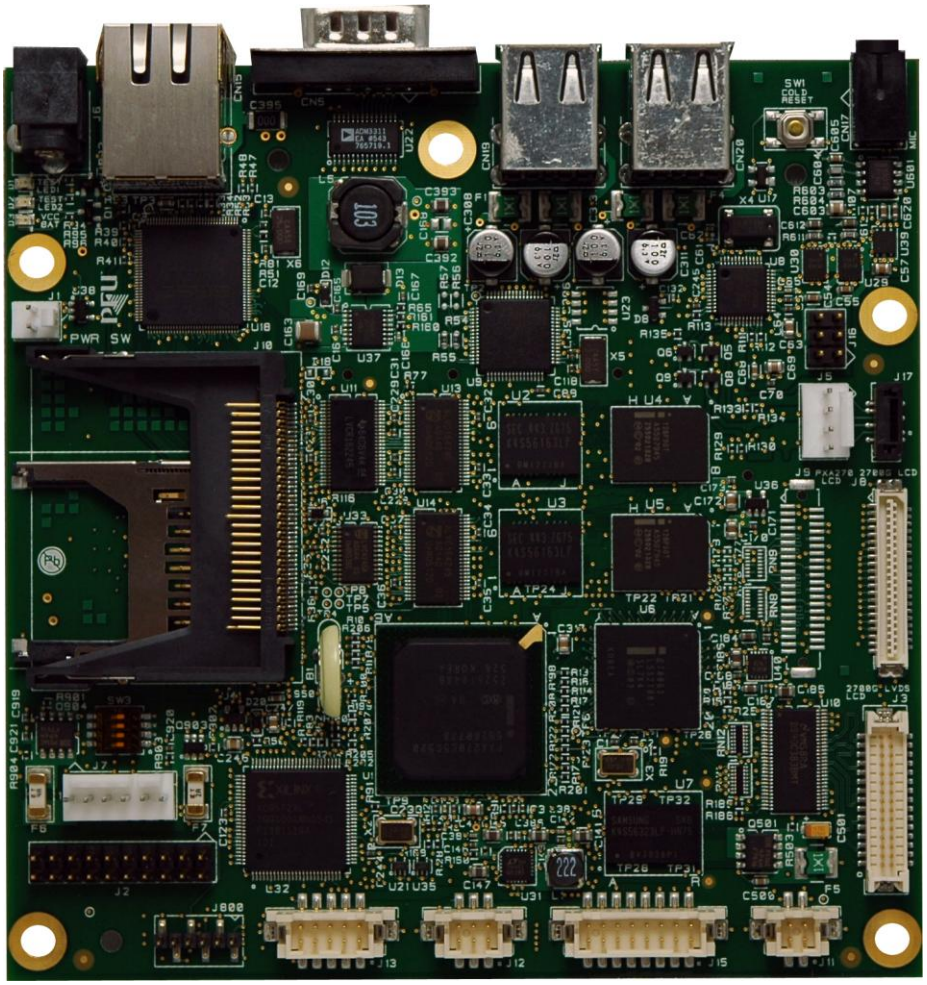
Media Engine™ User Manual

Version 2.3



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Introduction

Thank you for basing your system on our XScale based Media Engine™ Single Board Computer (SBC). We are confident that it will help you get your product to market quickly while reducing overall development cost.

The Media Engine User Manual explains the features, functions, and technical specifications for PFU Systems Media Engine Single Board Computer. Specifically, it describes the board layout, connectors and jumpers, active components, mechanical and environmental ratings, and provides signal descriptions.

Two versions of the Media Engine are available. One version includes 2700G Multimedia Accelerator to drive LCD displays the other version uses the direct output of the processor to drive LCD display.

Review the information contained in this manual before using the Media Engine.

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Related Documentation

Please consult the following documents for additional information on the Media Engine.

Description	Type	Number
Media Engine Software User Manual	Manual	PS-XMESW-UM-xxx (*1, *2)

Table 1 - Related Documents

*1 – xxx refers to current version.

*2 – Due to the confidential nature of the material in this document, a Non Disclosure Agreement between the customer and PFU Systems must be executed. Please contact your PFU Systems sales representative for details.

You can obtain the status of PFU Systems documents from PFU Systems web site (www.PFUsystems.com) or requested from a PFU Systems sales representative. Many PFU documents can be downloaded form this web site.

Applicable Media Engine Board Products

This manual is applicable to the following Media Engine Boards:

Part No.	Description	DRAM	Flash	2700G Graphics	OS
PSXME12864GW	Media Engine™ with Intel PXA270 and 2700G Multimedia Accelerator with 128MB DRAM, 64MB Flash & Windows CE 5.0	128MB	64MB	Yes	Windows CE 5.0
PSXME12864GL	Media Engine™ with Intel PXA270 and 2700G Multimedia Accelerator with 128MB DRAM, 64MB Flash & Linux Bootloader	128MB	64MB	Yes	Windows CE 5.0
PSXME6432NW	Media Engine™ with Intel PXA270 – Native Graphics Option with 64MB DRAM, 32MB Flash & Windows CE 5.0	64MB	32MB	No	Linux Bootloader
PSXME6432NL	Media Engine™ with Intel PXA270 – Native Graphics Option with 64MB DRAM, 32MB Flash & Linux Bootloader	64MB	32MB	No	Linux Bootloader

Table 2 - Applicable Board Products

Development Kit

To get a head start, you may also want to order a Media Engine Development Kit for a complete set of accessories for the Media Engine. The Media Engine Development Kit contains the items listed below.

Part No.	Description
PSXMEKITA	Media Engine Development Kit
	12V/60W 100 ~ 240VAC AC Adapter with US AC power cable
	Stereo Speaker Assembly
	Registry Clear Plug
	4-Wire Touch Panel
	12.1” XGA 24bpp LVDS LCD Panel
	LVDS Data Cable
	Backlight Inverter
	Inverter Cable
	Printed version of this manual

Table 3 - Development Kit Contents

Other Components You May Need

In addition to the items included with the Media Engine board package, you may need some or all of the following components. These items can be ordered separately from PFU Systems.

- USB Flash Drive
- USB Key Board
- USB Mouse
- Secure Digital (SD) Card
- Compact Flash (CF) Card

Table 4 - Other Components You May Need

Other Documents You May Need

These documents from other sources may be helpful in using the Media Engine.

Description	Source
Intel PXA270 Processor Datasheet	www.intel.com
Intel PXA27x Processor Family Design Guide	www.intel.com
Intel PXA27x Processor Family Developer's Manual	www.intel.com
Intel 2700G Multimedia Accelerator Datasheet	www.intel.com
Intel 2700G Multimedia Accelerator Design Guide	www.intel.com
CF+ and CompactFlash Specification Revision 3.0	www.compactflash.org
Secure Digital Card Specifications	
I2C Specifications	
SPI Specifications	

Table 5 - Other Documents You May Need

Layout of This Manual

Introduction

Provides an overview of package content and related materials.

Chapter 1 Installation and Startup

Describes how to install, configure, and set up the Media Engine and how to use the development kit.

Chapter 2 Design Overview

Provides a brief overview of the Media Engine board design.

Chapter 3 Features

Describes the implemented features of the Media Engine board.

Chapter 4 Mechanical Specifications

Provides dimensions and mounting details of the Media Engine board.

Chapter 5 Interface Specifications

Describes Media Engine I/O interface connector pin assignments.

Chapter 6 Operating System

Describes operating system considerations for the Media Engine.

Symbols Used In This Manual

The following symbols are used in this manual:

Explains supplementary details.
Read as necessary.

Draws attention to a precaution that should be observed.
Alternately warns of an unacceptable or dangerous practice.
Should always be read!

References related information in a different area of this manual, or in another manual.

Figure 1: Symbols Used in This Manual

Table of Contents

Introduction 2
Trademarks: 2
Related Documentation 2
Applicable Media Engine Board Products 3
Development Kit 3
Other Components You May Need 4
Other Documents You May Need 4
Layout of This Manual 4
Introduction 4
Chapter 1 Installation and Startup 4
Chapter 2 Design Overview 4
Chapter 3 Features 4
Chapter 4 Mechanical Specifications 4
Chapter 5 Interface Specifications 4
Chapter 6 Operating System 4
Symbols Used In This Manual 5
Table of Contents 6
List of Figures 8
List of Tables 9
Chapter 1 – Installation and Startup 10
Basic Media Engine Installation 10
Unpacking the Media Engine SBC 10
Installing the Media Engine SBC 10
Media Engine Development Kit Installation 10
Unpacking the Development Kit 10
Assembly of the Development Kit and the Media Engine 10
Starting Up the Media Engine Operating System 11
Chapter 2 – Design Overview 12
Introduction 12
Media Engine Block Diagram 13
Media Engine Specifications 15
Headers, Connectors, Switches and LEDs 17
Media Engine Connectors 19
Switches 20
LCD Table 20
LED Indicators 20
Chapter 3 - Features 21
10/100 Mbps Ethernet Support (1 Port) 21
AC Adapter Support 21
Secure Digital 21
Serial Interface 21
Touch Panel 21
JTAG 21
CompactFlash 22

USB Interface 22
Audio Support 22
LCD Interface 22
Backlight Inverter 22
GPIO 22
SPI 23
I^2C 23
Chapter 4 Mechanical Specifications 24
Top View 24
Edge View 25
Chapter 5 - Interface Specifications 26
JTAG (J2) 26
Ethernet (CN15) 26
Touch Panel FPC (J17) 27
Touch Panel (J5) 27
LCD Inverter (J7) 27
2700G CMOS LCD (J8) 27
PXA270 CMOS LCD (J9) 28
2700G LVDS LCD (J3) 29
CompactFlash (J10) 30
Secure Digital (J14) 31
COM1 (CN5) 31
I^2C (J11) 32
SPI (J12) 32
IRDA/BT (J13) 32
GPIO (J15) 33
Speaker (J16) 33
MIC IN (CN17) 34
DC JACK (J6) 34
USB (CN19, CN20) 34
Chapter 6 Windows Operating System 35
Operating System Installation 35
Registry Save Utility 35
To initiate the Registry Save Utility 35
Registry Clear Plug 36
Touch Panel Calibration 36
To calibrate the Media Engine 36
Appendix A 39
List of Clock Frequencies 39
Index 40

List of Figures

Figure 1: Symbols Used in This Manual 5
Figure 2: Touch Panel Lead Orientation 11
Figure 3: Cable Connection Locations 11
Figure 4 - Media Engine Block Level Diagram 13
Figure 5 - Media Engine Block Level Diagram (Native Graphics Option) 14
Figure 6 - Top View of Media Engine Connectors 17
Figure 7 - Top View of Media Engine Connectors (Native Graphics Option) 18
Figure 8 - Media Engine Connector/Mounting Dimensions Top View 24
Figure 9 - Media Engine Connector/Mounting Dimensions Edge View 25
Figure 10 - Windows CE Start Menu 35
Figure 11 - Prepare System for Shut Down Dialog Box 35
Figure 12 - It is now safe to turn off your computer 36
Figure 13 - Select Control Panel from the Start Menu 36
Figure 14 - Stylus Properties Dialog Box 37
Figure 15 - Calibrate Screen 37

List of Tables

Table 1 - Related Documents 2
Table 2 - Applicable Board Products 3
Table 3 - Development Kit Contents 3
Table 4 - Other Components You May Need 4
Table 5 - Other Documents You May Need 4
Table 6 - Media Engine Specifications 16
Table 7 - Media Engine Connectors 19
Table 8 - Momentary Switch SW1 20
Table 9 - DIP Switch SW3 20
Table 10 - LCD Table 20
Table 11 - LED Indicators 20
Table 12 - PXA270 JTAG Pin Outs 26
Table 13 - Ethernet RJ45 Pin Outs 27
Table 14 - FPC Touch Panel Pin Outs 27
Table 15 - Discrete Wire Touch Panel Pin Outs 27
Table 16 - Inverter Backlight Pin Outs 27
Table 17 - CMOS LCD Connector Pin Outs 28
Table 18 - PXA270 CMOS LCD Connector Pin Outs (Native Graphics Option) 29
Table 19 - LVDS LCD Connector Pin Outs 30
Table 20 - Type II Socket Pin Outs 31
Table 21 - Secure Digital Connector Pin Outs 31
Table 22 - COM1 Connector Pin Outs 32
Table 23 - I2C Connector Pin Outs 32
Table 24 - SPI Connector Pin Outs 32
Table 25 - IRDA/BT Connector Pin Outs 33
Table 26 - GPIO Connector Pin Outs 33
Table 27 - Speaker Connector Pin Outs 34
Table 28 - Microphone Connector Pin Outs 34
Table 29 - DC Jack Pin Outs 34
Table 30 - USB Connector Pin Outs 34
Table 31 - Frequencies Used Internally by the Media Engine 39

1

Chapter 1 – Installation and Startup

This chapter describes how the Media Engine is packaged and how to prepare for the power on.

Basic Media Engine Installation

Installation and startup of the Media Engine Single Board Computer (SBC) in general purpose environment.

Unpacking the Media Engine SBC

The Media Engine ships with preconfigured DRAM Memory, Flash, and Operating System. User modifications to the configurations are not generally possible.

Installing the Media Engine SBC

Mount the Media Engine Board in a suitable location. Refer to the chapter on Mechanical Specifications for mounting information. Provide power to the Media Engine using a suitable power supply. Refer to the Design Overview chapter for power requirements and the Interface Specifications chapter for connector details.

There are five mounting holes on the Media Engine. These mounting holes have a diameter of 4.2 millimeter and a pad diameter of 8 millimeter. PFU Systems recommends using M3.5 screws for mounting.

Media Engine Development Kit Installation

Installation and startup of the Media Engine with the Media Engine Development Kit.

Unpacking the Development Kit

Media Engine Development Kit includes these items

4-Wire Touch Panel

12.1” XGA 24bpp LVDS LCD Panel

LVDS Data Cable

Backlight Inverter

Inverter Cable

Stereo Speaker Assembly

12V/60W 100 ~ 240VAC AC Adapter with US AC power cable

Registry Clear Plug

See the Media Engine Software User Manual for use of the Registry Clear Plug.

Assembly of the Development Kit and the Media Engine

Refer to the figures below for cabling locations.

1. Mount the Media Engine SBC, Stereo Speaker Assembly, LCD Panel, Touch Panel, and Backlight Inverter on an appropriate foundation and locations relative to one another.
   Refer to the Touch Panel instructions for installation to the LCD Panel.
   Refer to the Media Engine SBC installation instructions above for mounting details.
2. Cable the Speaker Assembly to the Media Engine.

3. Cable the Touch Panel to the Media Engine.

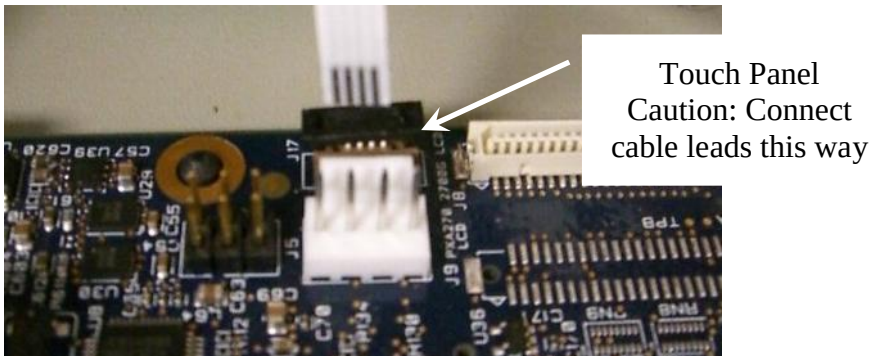


Figure 2: Touch Panel Lead Orientation

4. Cable the LCD Panel with the LVDS Data Cable to the Media Engine.
5. Cable the LCD Panel to the Backlight Inverter and with the Inverter Cable to the Media Engine.

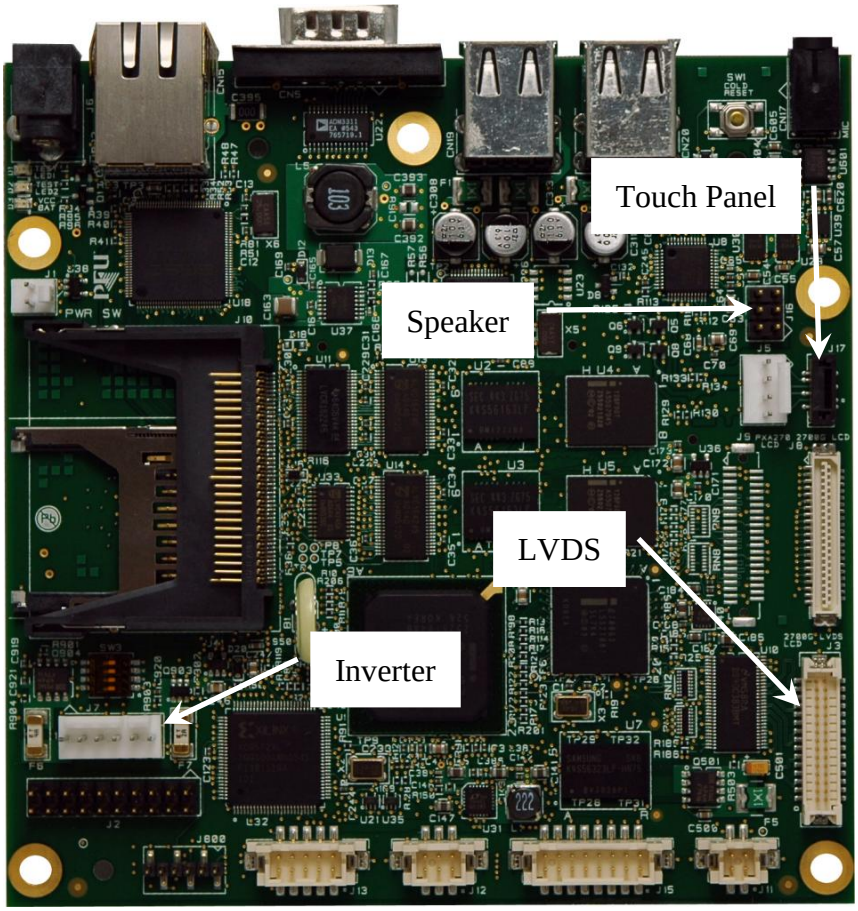


Figure 3: Cable Connection Locations

Starting Up the Media Engine Operating System

Connect the 12V AC Adapter and Power Cable to the Media Engine SBC.

When you apply power to the Media Engine, the operating system begins its startup process. As much as 15 seconds may elapse prior to the first image on the screen.

2

Chapter 2 – Design Overview

This chapter provides a brief overview of the Media Engine SBC design.

Introduction

PFU Systems' Media Engine is a Single Board Computer designed with the following characteristics:

- Low power
- Small footprint
- Industry standard ports
- Connectors for common interconnect

While effective in many applications, the Media Engine was targeted to the following markets:

- Indoor Media Display
- Outdoor Media Display
- Gasoline Service Applications
- Retail Cabinet Media Display (Disposable Computer)

In addition, the Media Engine meets requirements for the embedded control market by providing these ports:

- SPI compliant Serial Synchronous Port
- I^2C Bus Specification, Version 2.0
- General Purpose Input or Output (PXA270 GPIO)
- IrDA (The IrDA capability is not currently validated.)
- USB
- RS-232
- Serial Interfaces

A CompactFlash® Type II socket and a Secure Digital (SD) Card Slot provide connectivity to removable solid-state storage devices for software upgrades and system storage.

Media Engine Block Diagram

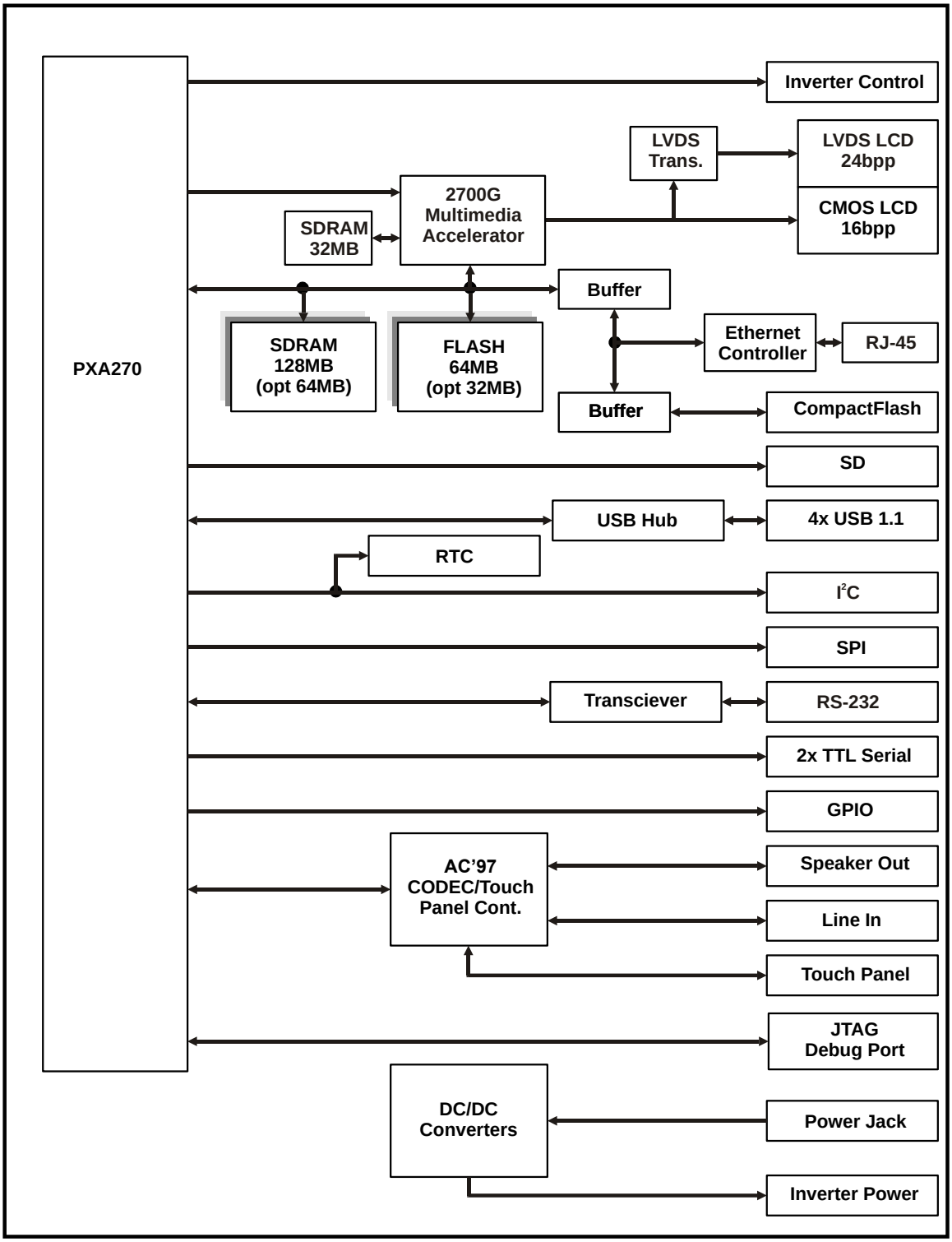


Figure 4 - Media Engine Block Level Diagram

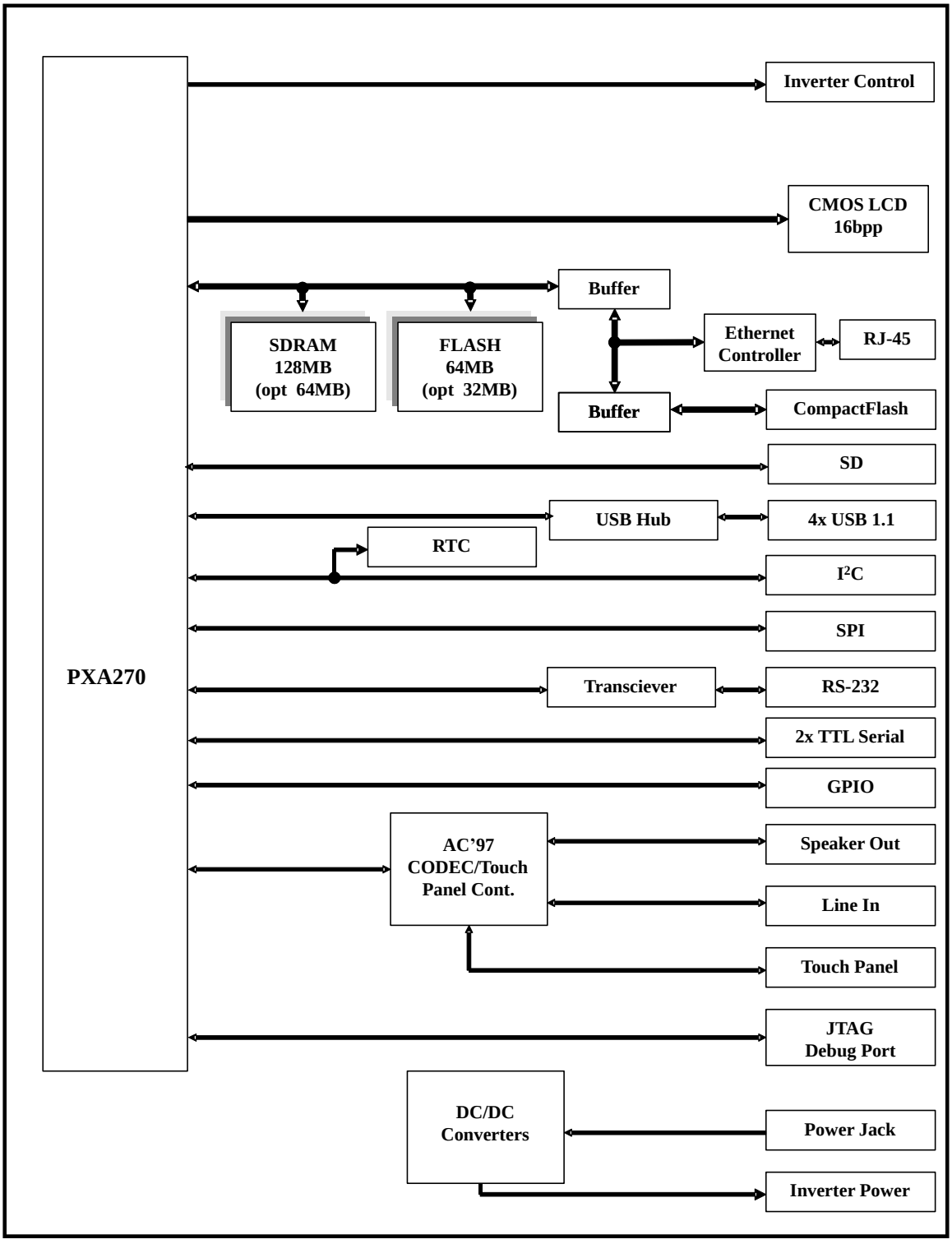


Figure 5 - Media Engine Block Level Diagram (Native Graphics Option)

Media Engine Specifications

Item	Specification	
Model Number	PSXME12864GW/L	PSXME6432NW/L
Description	Media Engine™ with Intel PXA270 and 2700G Multimedia Accelerator with 128MB SDRAM, 64MB Flash & Windows CE 5.0 or Linux Bootloader	Media Engine™ with Intel PXA270– Native Graphics Option with 64MB DRAM, 32MB Flash & Windows CE 5.0 or Linux Bootloader
Processor	32-bit, 520 MHz Intel PXA270 processor	
Cache		
Data	32KB	
Instruction	32KB	
Memory		
Internal SRAM	256KB	
SDRAM	128MB	64MB
Flash	64MB	32MB
IC Complement		
Graphics Accelerator	Intel® 2700G3 (Video up to 1024x768 color LCD interface)	None
Graphics Memory	32MB	None
Real Time Clock (±3 min/month 0°C to +50°C)	Philips® PCF8563T ±5 min/month -20°C to +60°C	
RTC Battery	On board Lithium for RTC – Battery Duration 7+ years	
Ethernet Controller	SMCS® LAN91C11I	
AC'97 Audio CODEC/Touch Panel Controller	Philips® UCB1400	
USB Hub	Philips® ISP1520BD	
I/O Interfaces		
CMOS LCD	1 x Single Channel 16bbp (64K) color (41-pin)	1 x Single Channel 16bbp (64K) color (41-pin)
LVDS LCD	1 x Single Channel 24bbp (64M) color (30-pin)	None
I^2C	1 x PXA270 I^2C (4-pin)	
SPI	1 x PXA270 SPI (6-pin)	
GPIO	10 x PXA270 GPIO (16-pin)	
Serial Port	1 x RS-232 (DB-9), 2 x TTL (10-pin)	
USB	4 x USB 1.1 Host (Type A)	
Ethernet	1x RJ-45	

Item	Specification
CompactFlash®	1 x Type II CF Socket
SD Card	1 x SD Slot
Audio	2 x 1W Stereo Speaker Out (6-pin)
Microphone	Mono Microphone Input 3.5mm Jack
JTAG	1 x PXA270 JTAG interface (20-pin)
Touch Panel	4-wire (1 x FPC, 1 x 4-pin header)
LCD Inverter Control	+5V, +12V, Brightness Control (6-pin)
Physical	
Dimensions	5” Length – 5” Width – 0.85” Height
Weight	3.9 ounces
Operating Environment	
Ambient Temperature	-20 – 60°C
Power Supply	12VDC +/-10%
Operating Humidity	20 – 80% RH, no condensation
Shock	50G
Vibration	2.2G
MTBF	85,000 hours
Storage Environment	
Ambient Temperature	-20 – 65°C
Humidity	0 – 90% RH, no condensation
Power Consumption	
Measured Maximum w/ 15”LCD	30W – Power Consumption was measured with a typical maximum configuration while running all diagnostics. This measurement includes a large LCD with 4 back light tubes. LCD p/n NEC NL10276BC30-17.
Measured Maximum w/o LCD	4W – Power Consumption was measured with a typical maximum configuration while running all diagnostics. This measurement does not include a LCD.

Table 6 - Media Engine Specifications

Headers, Connectors, Switches and LEDs

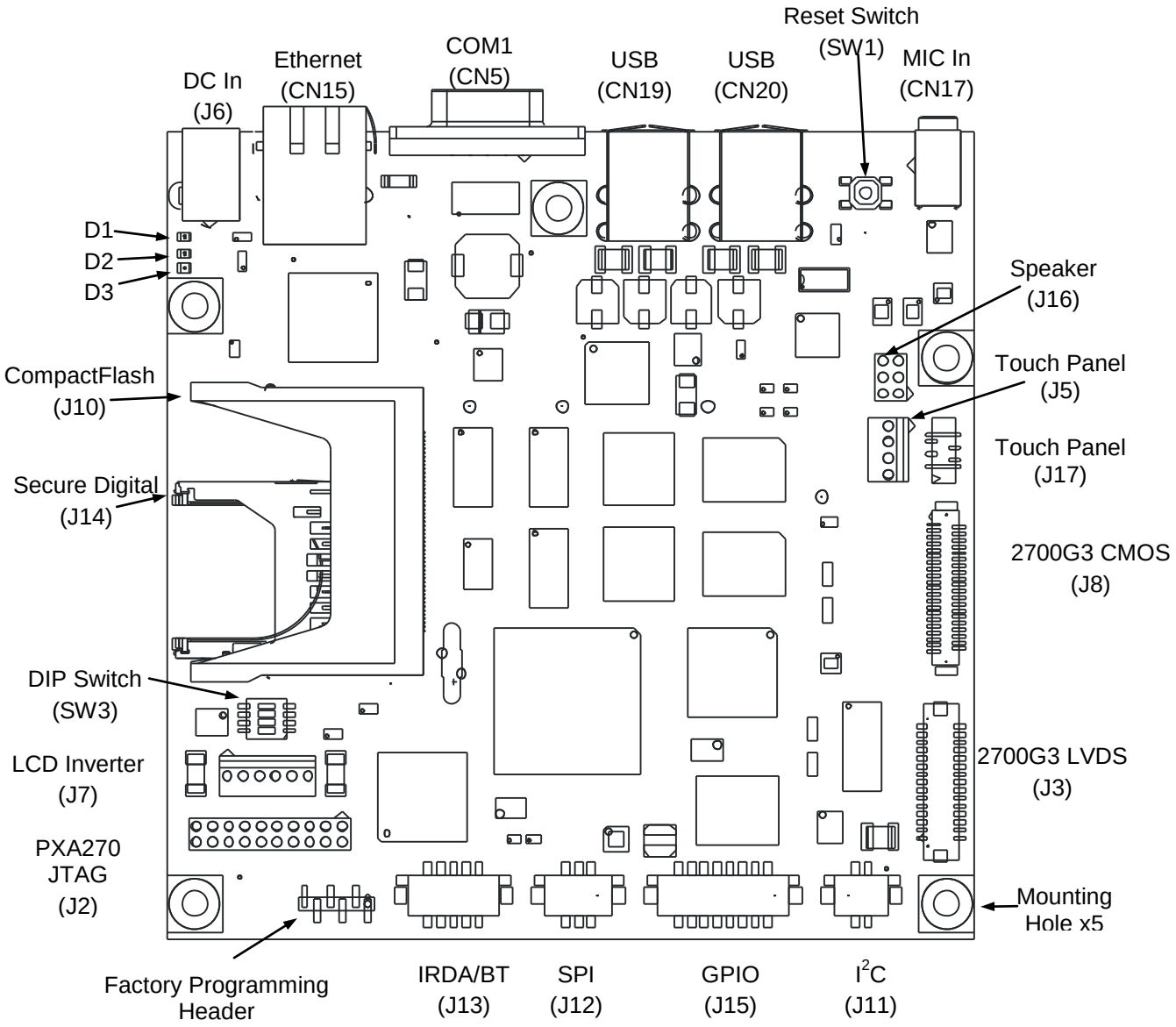


Figure 6 - Top View of Media Engine Connectors

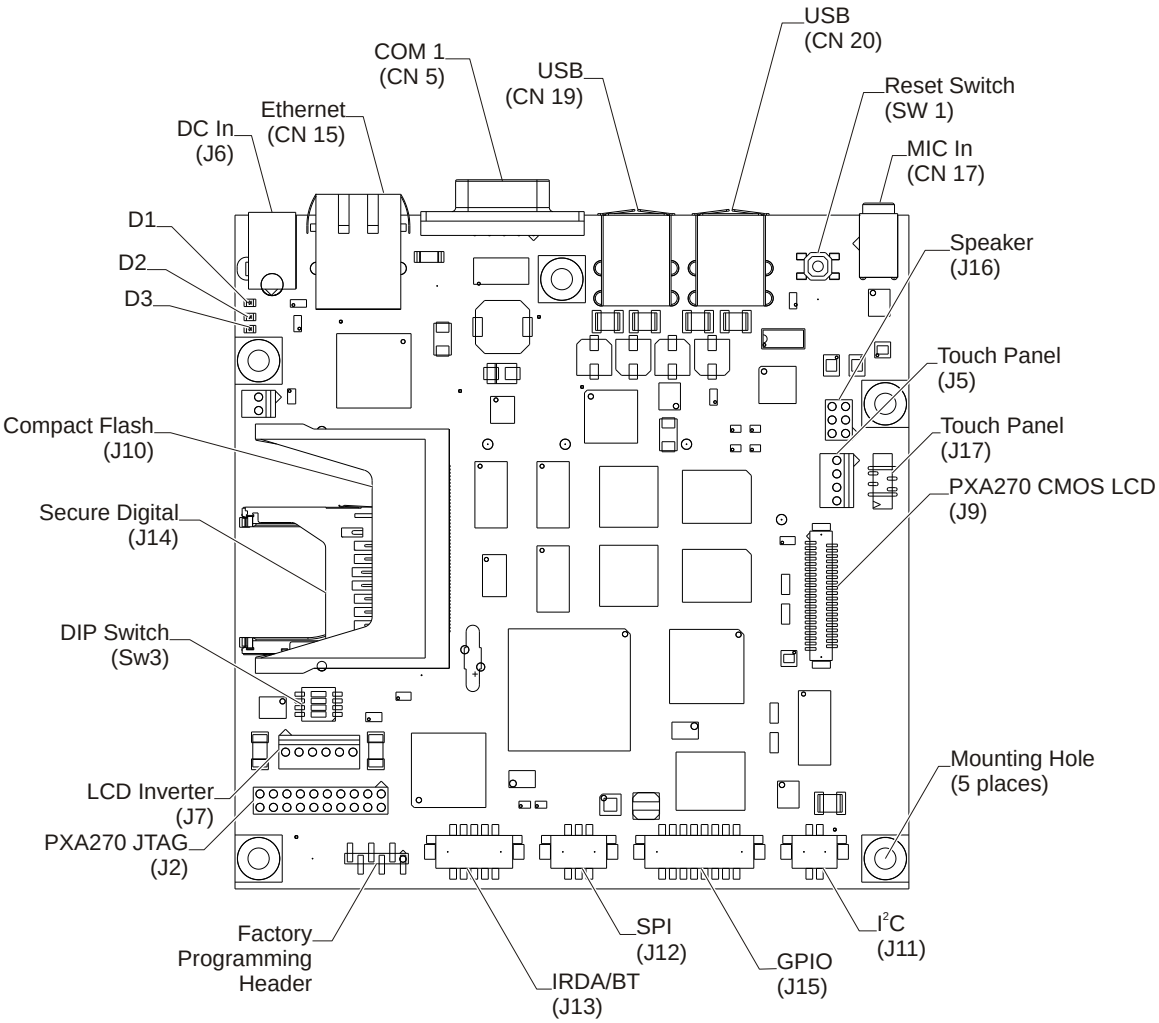


Figure 7 - Top View of Media Engine Connectors (Native Graphics Option)

Media Engine Connectors

The table below lists all the connectors on the Media Engine SBC.

Note For some parts, the actual component used may be an equivalent part having the same specification, but from a different manufacturer or with a different model number from the one listed here.

Connector	Function	Type	Mfr.	Part No.
J2	JTAG	2x10/2.54mm	SAMTEC	MTSW-110-07-G-D-240
CN15	Ethernet	RJ45	PULSE	J00-0065NL
J17	Touch Panel FPC	4-pin, SMT, FPC	FCI	SFW4S-2STME1LF
J5	Touch Panel Wire	4-pin/2.54mm	MOLEX	22-23-2041
J7	LCD Inverter/Brightness	6-pin/2.54mm	MOLEX	22-23-2061
J8 (not in Native Graphics Option)	2700G CMOS	41-pin/1mm	HIROSE	DF9B-41P-1V(32)
J9 (Native Graphics Option only)	PXA270 CMOS LCD	41-pin/1mm	HIROSE	DF9B-41P-1V(32)
J3(not in Native Graphics Option)	2700G LVDS	30-pin/1.25mm	HIROSE	DF13-30DP-1.25V(56)
J10	CompactFlash in Socket	Type II	DDK	MCD-CEN750PE-FE
J14	Secure Digital	Bottom Mount SD	MOLEX	54786-0971
CN5	COM1	DB-9, MALE	KYCON	K31X-E9P-N30
J11	I²C	2x2/2mm	HIROSE	DF11G-4DP-2V(50)
J12	SPI	2x3/2mm	HIROSE	DF11G-6DP-2V(50)
J13	IRDA/BT	2x5/2mm	HIROSE	DF11G-10DP-2V(50)
J15	GPIO	2x8/2mm	HIROSE	DF11G-16DP-2V(50)
J16	Speaker	2x3/2.54mm	SAMTEC	MTSW-103-07-G-D-240
CN17	MIC In	Audio Jack/3.5mm	KYCON	STX-3000
J6	DC Jack	Power 2.5mm/5.5mm	SWITCHCRAFT	RAPC712X
CN19-20	USB 1&2, USB 3&4	Dual Stack USB	TYCO/AMP	5787617-1

Table 7 - Media Engine Connectors

Switches

Momentary Switch SW1

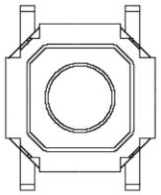
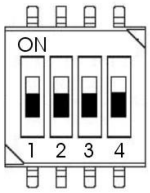
Switch	Function	
SW1	Reset Switch	

Table 8 - Momentary Switch SW1

DIP Switch SW3

Switch #	Function	On	Off	Default	
1	IRDA/Serial	IRDA	Serial (*1)	Off	
2	LCD Type 1	Refer to LCD Table	Refer to LCD Table	On	
3	LCD Type 2	Refer to LCD Table	Refer to LCD Table	On	
4	Reserved	Reserved	Reserved	(*2)	

*1. IRDA functionality is not validated at this time.

*2. Switch 4 is set at the factory. Changing the setting will result in unstable operation.

*3. Switches 2 & 3 are not applicable to the Native Graphics Option and should be left unchanged.

Table 9 - DIP Switch SW3

LCD Table

LCD Type 1 (Switch 2)	LCD Type 2 (Switch 3)	Qualified LCD's (Contact PFU for a current list)		
		Manufacturer	P/N	Resolution
OFF (default position)	OFF (default position)	NEC NEC	NL10276BC30-17 NL10276BC24-13	XGA 15" XGA 12.1"
ON	OFF	NEC	NL8060BC26-27	SVGA
OFF	ON	NEC	NL6448BC20-08	VGA
ON	ON	Reserved	Reserved	Reserved

Table 10 - LCD Table

LED Indicators

LED	Color	Function
D1	Red	Diagnostics (GPIO52)
D2	Yellow	Diagnostics (GPIO53)
D3	Green	VCCBAT (PXA270 Initial Power)
CN15	Green & Yellow	Yellow On & Green Off = 10Mbps Link Yellow ON & Green ON = 100Mbps

Table 11 - LED Indicators

Chapter 3 - Features

This chapter describes the implemented features of the Media Engine board.

10/100 Mbps Ethernet Support (1 Port)

The Media Engine uses a SMSC LAN91C111 single chip MAC and PHY Ethernet controller. The Controller supports 10/100Mbps networks, Full/Half Duplex and Auto Negotiation. The Ethernet port uses an industry standard RJ-45 connector (CN15) with LED's for Link and Speed. An Ethernet crossover cable is required to connect directly to a host.

AC Adapter Support

The Media Engine requires the use of a 12VDC AC Adapter connected to the DC-IN jack (J6) with a 30W~60W power rating depending on the peripherals attached to it.

Secure Digital

The Media Engine provides one SD (Secure Digital) interface. This interface supports the bus protocol identified in the MMC System Specification 3.2 and SD Memory Card, Specification Version 1.01 and SDIO Memory Card Specification Version 1.0.

Serial Interface

Three 16550A compatible UARTS are provided. COM1 is a full function RS232 serial port that uses a standard 9-pin D-SUB male connector (CN5). COM2 is a 4-wire CMOS level serial interface that supports RTS & CTS on a 10-pin header (J13). COM3 is a 2-wire CMOS level serial interface that does not support any modem control, these signals are also on connector (J13).

Maximum data rate for COM2 is 38400.

Touch Panel

The Media Engine supports a 4-wire resistive touch screen interface. The touch screen can be connected directly using a FPC type connector (J17) or discrete wire connector (J5) with a custom adapter board.

JTAG

The Media Engine provides a debug JTAG port (J2) that conforms to the IEEE Std. 1149.1–1990 and IEEE Std. 1149.1a-1993, *Standard Test Access Port and Boundary-Scan Architecture*. This port is only connected to the PXA270 and is used for software debugging and programming the flash memory.

Contact your local PFU Systems sales representative for qualified Software Development tools.

CompactFlash

The Media Engine supports one Type II CompactFlash slot (J10). The CompactFlash interface conforms to *CF+ and CompactFlash Specification Version 1.4*.

The CF interface does not support removal or insertion (hot-swappable) while the Media Engine is powered.

USB Interface

The Media Engine supports four host USB 1.1 ports using two dual-stacked connectors (CN19 & CN20).

The Media Engine can provide up to 0.5A to each USB 1.1 port. A current limiting device provides over-current protection for each port and will open when the current draw exceeds 0.5A. This device is self-resetting when the fault condition is removed.

Audio Support

The Media Engine uses a Philips UCB1400 20-bit stereo audio Codec. The speaker out header (J16) features 1 Watt per channel output power to directly drive two external 8-ohm speakers. The microphone interface uses an industry standard 3.5mm connector (CN17) and supplies a 2.25V reference voltage.

LCD Interface

The Media Engine uses the Intel® 2700G Multimedia Accelerator with 32MB of video memory for high performance graphics and video acceleration. Direct connection to a TFT LCD can be made through the parallel CMOS 16bpp (bits-per-pixel) 41-pin connector (J8) or from the serial LVDS 24bpp 30-pin connector (J3). The Media Engine is preconfigured to support VGA, SVGA or XGA LCD panels from NEC. See the LCD Table (Table 10) for the supported panels that can be selected with the dip switch (SW3). The Native Graphics Option version of the Media Engine without the 2700G Multimedia Accelerator can be directly connected to a TFT LCD through the parallel CMOS 16bpp 41-pin connector (J9).

Contact your local PFU Systems sales representative if support for a different LCD panel is required.

Backlight Inverter

The Media Engine provides switched power for 5V or 12V backlight inverters on a 6-pin connector (J7). LCD brightness control is also supported through a digital potentiometer controlled through an API.

GPIO

Each GPIO pin can be programmed as an input or output. When programmed as an input, a GPIO can also serve as an interrupt source to sample rising or falling edges. When programmed as an output the GPIO's can be individually cleared or set. See PXA27x Processor Family Developer's Manual for more information on configuring GPIO. This interface is provided on a 16-pin shrouded header (J15).

Most GPIO pins are 3.3V tolerant. GPIO_EXPAND5 and GPIO_EXPAND6 are 2.5V tolerant. Level translation must be performed for voltages exceeding these levels. GPIO pins are not intended for driving heavy loads.

SPI

The Media Engine provides one Serial Synchronous Port that supports the Motorola SPI full-duplex protocol. This interface is provided through a 6-pin shrouded header (J12).

I^2C

The Media Engine supports one I^2C interface (J11) that is compliant with *I^2C Bus Specification*, Version 2.0. This interface features multi-master and arbitration support. The bus can operate at a standard-speed of 100kbs or fast-mode at 400kbps.

4

Chapter 4 Mechanical Specifications

This chapter provides the dimensions of the Media Engine board in millimeters.

Top View

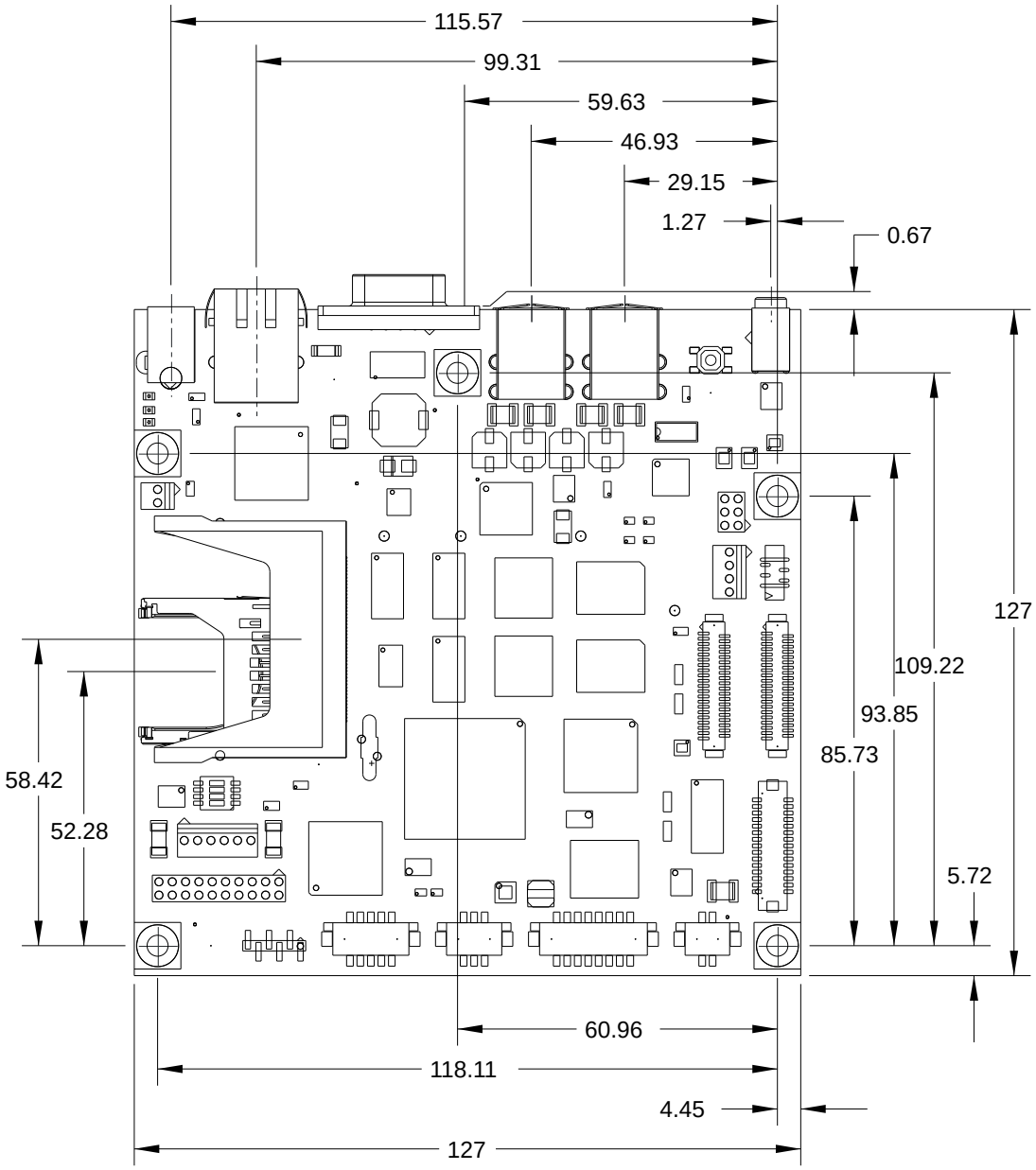


Figure 8 - Media Engine Connector/Mounting Dimensions Top View

Edge View

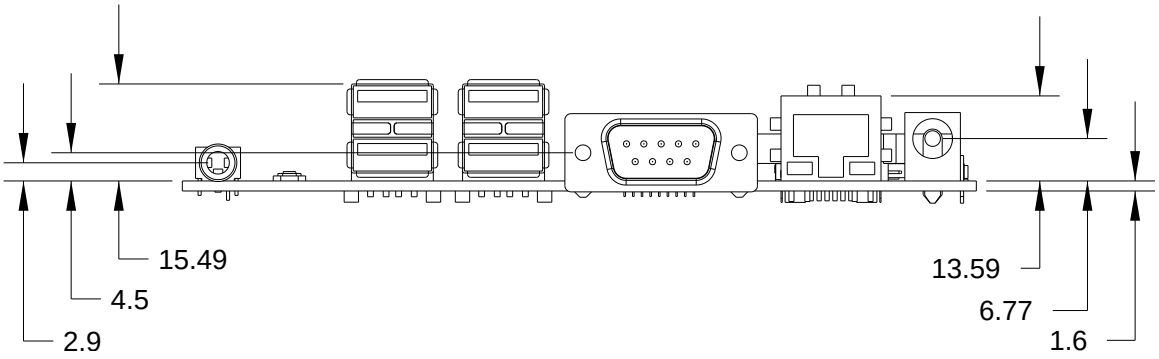


Figure 9 - Media Engine Connector/Mounting Dimensions Edge View

The mounting holes for the Media Engine are 4.2 millimeters in diameter with an 8-millimeter pad. This hole size best accommodates an M3.5 screw.

5

Chapter 5 - Interface Specifications

This chapter provides detailed pin assignments and signal names for each individual interface.

JTAG (J2)

No.	Signal	Description	No.	Signal	Description
1	POWER	VCCBAT(3.3V early)	11	NC	No Connection
2	POWER	VCCBAT(3.3V early)	12	GND	Ground
3	JTAG_TRST#	PXA270 TRST#	13	JTAG_TDO	PXA270 TDO
4	GND	Ground	14	GND	Ground
5	JTAG_TDI	PXA270 TDI	15	RESET_IN	PXA270 RESET#
6	GND	Ground	16	GND	Ground
7	JTAG_TMS	PXA270 TMS	17	NC	No Connection
8	GND	Ground	18	GND	Ground
9	JTAG_TCLK	PXA270 TCLK	19	NC	No Connection
10	GND	Ground	20	GND	Ground

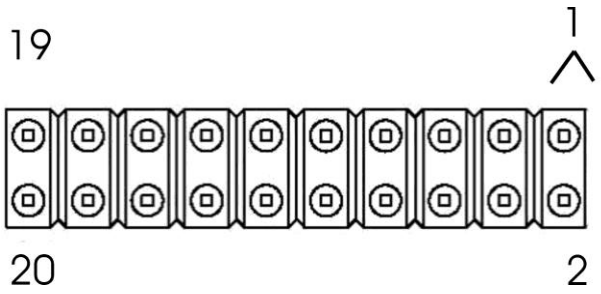
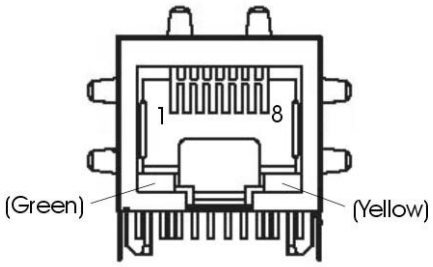


Table 12 - PXA270 JTAG Pin Outs

Ethernet (CN15)

No.	Signal	
1	TPO_P	
2	TPO_N	
3	TPI_P	
4	VCC3R3	
5	NC	
6	TPI_N	
7	NC	



No.	Signal	
8	Ground	

Table 13 - Ethernet RJ45 Pin Outs

Touch Panel FPC (J17)

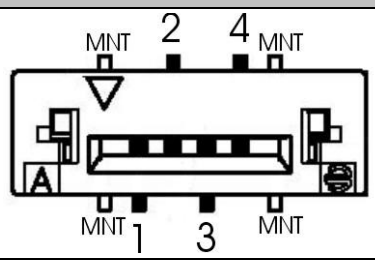
No.	Signal	Description	
1	TSMY	Touch Screen Negative Y-plate	
2	TSMX	Touch Screen Negative X-plate	
3	TSPY	Touch Screen Positive Y-plate	
4	TSPX	Touch Screen Positive X-plate	

Table 14 - FPC Touch Panel Pin Outs

Touch Panel (J5)

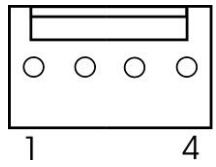
No.	Signal	Description	
1	TSPX	Touch Screen Positive X-plate	
2	TSPY	Touch Screen Positive Y-plate	
3	TSMX	Touch Screen Negative X-plate	
4	TSMY	Touch Screen Negative Y-plate	

Table 15 - Discrete Wire Touch Panel Pin Outs

LCD Inverter (J7)

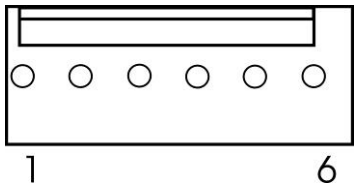
No.	Signal	Description	
1	VCC12	Switched 12V	
2	GND	Ground	
3	GND	Ground	
4	VCC5	Switched 5V	
5	DPOT_VL	Digital POT HIGH-SIDE	
6	DPOT_VW	Digital POT LOW-SIDE	

Table 16 - Inverter Backlight Pin Outs

2700G CMOS LCD (J8)

No.	Signal	Description	No.	Signal	Description
1	GND	GROUND	22	GND	GROUND
2	LCD1_PCLK	LCD DOT CLOCK	23	LCD1_D13	LCD G3
3	GND	GROUND	24	LCD1_D14	LCD G4
4	LCD1_LCLK	LCD H-SYNC	25	LCD1_D15	LCD G5
5	LCD1_FCLK	LCD V-SYNC	26	GND	GROUND
6	GND	GROUND	27	GND	GROUND

No.	Signal	Description	No.	Signal	Description
7	GND	GROUND	28	GND	GROUND
8	GND	GROUND	29	LCD1_D2	LCD B0
9	LCD1_D18	LCD R0	30	LCD1_D3	LCD B1
10	LCD1_D19	LCD R1	31	LCD1_D4	LCD B2
11	LCD1_D20	LCD R2	32	GND	GROUND
12	GND	GROUND	33	LCD1_D5	LCD B3
13	LCD1_D21	LCD R3	34	LCD1_D6	LCD B4
14	LCD1_D22	LCD R4	35	LCD1_D7	LCD B5
15	LCD1_D23	LCD R5	36	GND	GROUND
16	GND	GROUND	37	LCD1_DEN	LCD DATA ENABLE
17	GND	GROUND	38	N/C	NO CONNECTION
18	GND	GROUND	39	VCC_LCD	SWITCHED 3.3V
19	LCD1_D10	LCD G0	40	VCC_LCD	SWITCHED 3.3V
20	LCD1_D11	LCD G1	41	GND	GROUND
21	LCD1_D12	LCD G2			

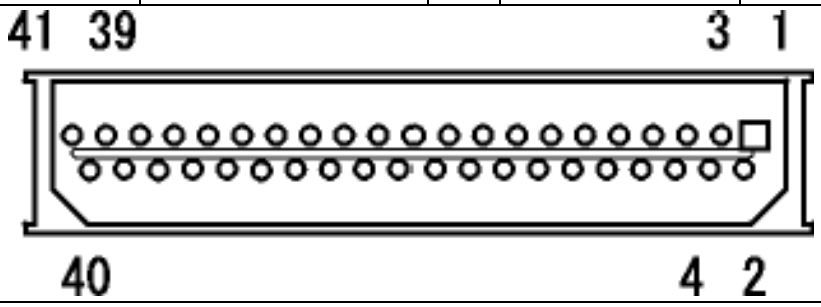


Table 17 - CMOS LCD Connector Pin Outs

PXA270 CMOS LCD (J9)

No.	Signal	Description	No.	Signal	Description
1	GND	GROUND	22	GND	GROUND
2	LCD_PCLK	LCD DOT CLOCK	23	LCD_D9	LCD G4
3	GND	GROUND	24	LCD_D10	LCD G5
4	LCD_LCLK	LCD H-SYNC	25	LCD_D11	LCD R0
5	LCD_FCLK	LCD V-SYNC	26	GND	GROUND
6	GND	GROUND	27	GND	GROUND
7	GND	GROUND	28	GND	GROUND
8	GND	GROUND	29	LCD_D0	LCD B0
9	LCD_D12	LCD R1	30	LCD_D1	LCD B1
10	LCD_D13	LCD R2	31	LCD_D2	LCD B2
11	LCD_D14	LCD R3	32	GND	GROUND
12	GND	GROUND	33	LCD_D3	LCD B3

No.	Signal	Description	No.	Signal	Description
13	LCD_D15	LCD R4	34	LCD_D4	LCD B4
14	LCD_D16	RESERVED	35	LCD_D5	LCD G0
15	LCD_D17	RESERVED	36	GND	GROUND
16	GND	GROUND	37	LCD_BIAS	LCD DATA ENABLE
17	GND	GROUND	38	VCC_LCD	SWITCHED 3.3V
18	GND	GROUND	39	VCC_LCD	SWITCHED 3.3V
19	LCD_D6	LCD G1	40	VCC_LCD	SWITCHED 3.3V
20	LCD_D7	LCD G2	41	LCD_MODE	GROUND
21	LCD_D8	LCD G3			

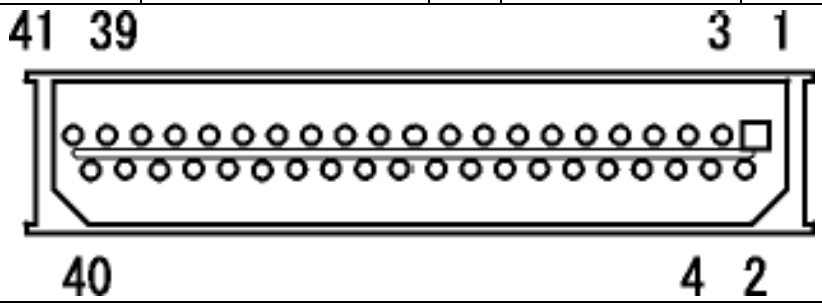


Table 18 - PXA270 CMOS LCD Connector Pin Outs (Native Graphics Option)

2700G LVDS LCD (J3)

No.	Signal	Description	No.	Signal	Description
1	VCC_LCD	SWITCHED 3.3V	2	VCC_LCD	SWITCHED 3.3V
3	TXOUT3+	LCD[GND,B1,B0,G1,G0,R1,R0]	4	VCC_LCD	SWITCHED 3.3V
5	TXOUT3-	LCD[GND,B1,B0,G1,G0,R1,R0]	6	GND	GROUND
7	GND	GROUND	8	GND	GROUND
9	TXCLKOUT+	LCD DOT CLOCK	10	GND	GROUND
11	TXCLKOUT-	LCD DOT CLOCK	12	GND	GROUND
13	GND	GROUND	14	GND	GROUND
15	TXOUT2+	LCD[DATA EN, V-SYNC,H-SYNC, B7,B6,B5,B4]	16	GND	GROUND
17	TXOUT2-	LCD[DATA EN, V-SYNC,H-SYNC, B7,B6,B5,B4]	18	GND	GROUND
19	GND	GROUND	20	GND	GROUND
21	TXOUT1+	LCD[B3,B2,G7,G6,G5,G4,G3]	22	GND	GROUND
23	TXOUT1-	LCD[B3,B2,G7,G6,G5,G4,G3]	24	GND	GROUND
25	GND	GROUND	26	GND	GROUND
27	TXOUT0+	LCD[G2,R7,R6,R5,R4,R3,R2]	28	GND	GROUND
29	TXOUT0-	LCD[G2,R7,R6,R5,R4,R3,R2]	30	GND	GROUND

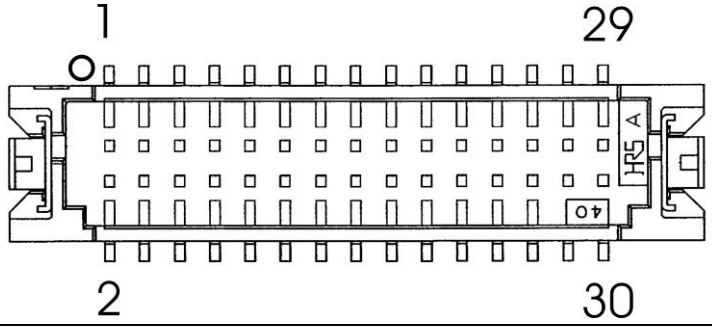
No.	Signal	Description	No.	Signal	Description
					

Table 19 - LVDS LCD Connector Pin Outs

CompactFlash (J10)

No.	Signal	Description	No.	Signal	Description
1	GND	GROUND	26	CF_CD2#	CD CD2
2	CF_D3	CF D03	27	CF_D11	CF D11
3	CF_D4	CF D04	28	CF_D12	CF D12
4	CF_D5	CF D05	29	CF_D13	CF D13
5	CF_D6	CF D06	30	CF_D14	CF D14
6	CF_D7	CF D07	31	CF_D15	CF D15
7	CF_PCE1#	CF –CE1	32	CF_PCE2#	CF-CE2
8	CF_A10	CF A10	33	NC	NO CONNECTION
9	CF_POE#	CF –OE	34	CF_PI0R#	CF –IORD
10	CF_A9	CF A09	35	CF_PI0W#	CF –IOWR
11	CF_A8	CF A08	36	CF_PWE#	CF –WE
12	CF_A7	CF A07	37	CF_RDY	CF IREQ
13	VCC3R3	3.3V	38	VCC3R3	3.3V
14	CF_A6	CF A06	39	GND	GROUND
15	CF_A5	CF A05	40	NC	NO CONNECTION
16	CF_A4	CF A04	41	CF_RESET_CPU	CF RESET
17	CF_A3	CF A03	42	CF_PWAIT#	CF –WAIT
18	CF_A2	CF A02	43	NC	NO CONNECTION
19	CF_A1	CF A01	44	CF_PREG#	CF –REG
20	CF_A0	CF A00	45	NC	NO CONNECTION
21	CF_D0	CF D00	46	NC	NO CONNECTION
22	CF_D1	CF D01	47	CF_D8	CF D08
23	CF_D2	CF D02	48	CF_D9	CF D09
24	CF_I0IS16#	CF –IOIS16	49	CF_D10	CF D10
25	CF_CD1#	CF CD1	50	GND	GROUND

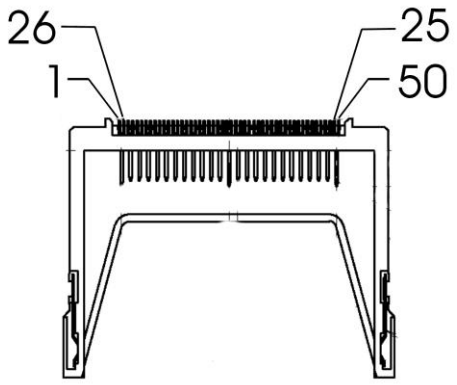
No.	Signal	Description	No.	Signal	Description
					

Table 20 - Type II Socket Pin Outs

Secure Digital (J14)

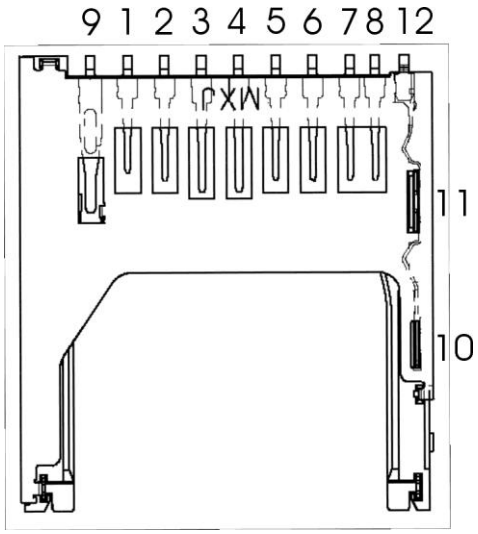
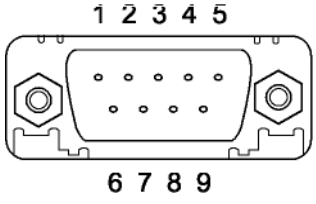
No.	Signal	Description	
1	MM_DAT3	SD Data Line 3	
2	MM_CMD	SD Command Line	
3	GND	GROUND	
4	VCC_MM	Switched 3.3V	
5	MM_CLK	SD Clock	
6	GND	GROUND	
7	MM_DAT0	SD DATA LINE 0	
8	MM_DAT1	SD DATA LINE 1	
9	MM_DAT2	SD DATA LINE 2	
10	MM_WP	SD WRITE PROTECT	
11	GND	GROUND	
12	MM_CD	SD CARD DETECT	

Table 21 - Secure Digital Connector Pin Outs

COM1 (CN5)

No.	Signal	Description	
1	SERA_DCD	Carrier Detected	
2	SERA_RxD	Receive Data	
3	SERA_TxD	Send Data	
4	SERA_DTR	Data Terminal Ready	
5	GND	Ground	

No.	Signal	Description	
6	SERA_DSR	Data Set Ready	
7	SERA_RTS	Request To Send	
8	SERA_CTS	Clear To Send	
9	SERA_RI	Ring Indicator	
10	GND	Ground	
11	GND	Ground	

Table 22 - COM1 Connector Pin Outs

I²C (J11)

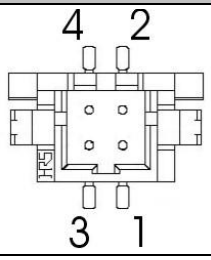
No.	Signal	Description	
1	I2C_SCL	I2C Serial Clock	
2	VCC3R3	3.3V	
3	GND	Ground	
4	I2C_SDA	I2C Serial Data	

Table 23 - I2C Connector Pin Outs

SPI (J12)

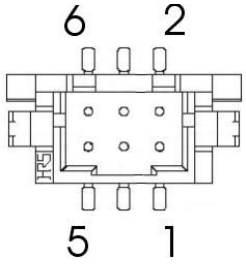
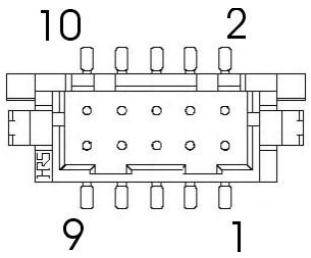
No.	Signal	Description	
1	SPI_FRM	SPI Frame	
2	SPI_CLK	SPI Clock	
3	SPI_RXD	SPI Receive Data	
4	SPI_TXD	SPI Transmit Data	
5	GND	Ground	
6	NC	RESERVED - DO NOT USE	

Table 24 - SPI Connector Pin Outs

IRDA/BT (J13)

No.	Signal	Description	
1	IRDA_TXD	IRDA Transmit Data	
2	VCC3R3	3.3V	
3	IRDA_EN#	IRDA –Enable	
4	IRDA_RXD	IRDA Receive Data	
5	BT_RXD	Blue Tooth Receive Data	
6	GND	Ground	
7	BT_CTS	Blue Tooth Clear to Send	
8	BT_TXD	Blue Tooth Transmit Data	

No.	Signal	Description	
9	GND	Ground	
10	BT_RTS	Blue Tooth Request to Send	

Table 25 - IRDA/BT Connector Pin Outs

GPIO (J15)

No.	Signal	Description	No.	Signal	Description
1	GPIO_EXPAND1	General Purpose Input or Output (PXA270 GPIO84)	9	GPIO_EXPAND7	General Purpose Input or Output (PXA270 GPIO93)
2	GND	Ground	10	GND	
3	GND	Ground	11	GPIO_EXPAND9	General Purpose Input or Output (PXA270 GPIO95)
4	GPIO_EXPAND2	General Purpose Input or Output (PXA270 GPIO83)	12	GPIO_EXPAND8	General Purpose Input or Output (PXA270 GPIO94)
5	GPIO_EXPAND4	General Purpose Input or Output (PXA270 GPIO82)	13	GPIO_EXPAND10	General Purpose Input or Output (PXA270 GPIO106)
6	GPIO_EXPAND3	General Purpose Input or Output (PXA270 GPIO81)	14	GND	Ground
7	GPIO_EXPAND6	General Purpose Input or Output (PXA270 GPIO14)	15	GND	Ground
8	GPIO_EXPAND5	General Purpose Input or Output (PXA270 GPIO19)	16	RESET	Reset from PXA270 (Active High)

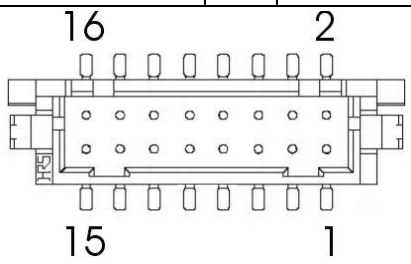


Table 26 - GPIO Connector Pin Outs

Speaker (J16)

No.	Signal	Description	
1	LINE_OUTL_P	Left Speaker Positive	
2	LINE_OUTR_P	Right Speaker Positive	
3	GND_AUD	Ground	
4	GND_AUD	Ground	

No.	Signal	Description	
5	LINE_OUTL_N	Left Speaker Negative	
6	LINE_OUTR_N	Right Speaker Negative	

Table 27 - Speaker Connector Pin Outs

MIC IN (CN17)

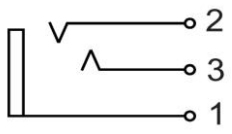
No.	Signal	Description	
1	GND_AUD	Ground	
2	MIC	Microphone In	
3	MIC_REF	Reference Voltage 2.25V	

Table 28 - Microphone Connector Pin Outs

DC JACK (J6)

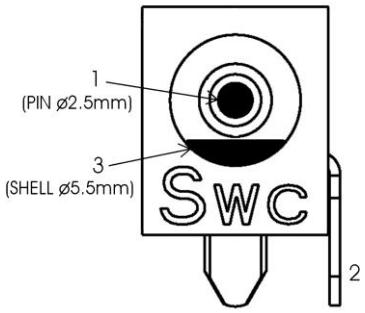
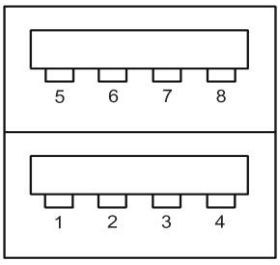
No.	Signal	Description	
1	+ Connection	12V DC	
2	NC	No Connection	
3	- Connection	GND	

Table 29 - DC Jack Pin Outs

USB (CN19, CN20)

No.	Signal	Description	
1	VCCx (*1)	USB Port x Power Port 1 and 3 respectively for CN19 and CN20 (*1)	
2	USBx- (*1)	USB 1.1 Port x Data (*1)	
3	USBx+ (*1)	USB 1.1 Port x Data (*1)	
4	GND	Ground	
5	VCCy (*2)	USB Port y Power (*2)	
6	USBy- (*2)	USB 1.1 Port y Data (*2)	
7	USBy+ (*2)	USB 1.1 Port y Data (*2)	
8	GND	Ground	

*1 Port 1 and 3 respectively for CN19 and CN20.

*2 Port 2 and 4 respectively for CN19 and CN20.

Table 30 - USB Connector Pin Outs

Chapter 6 Windows Operating System

Describes operating system considerations for the Media Engine. Refer to the Media Engine Software User Manual (PS-XMESW-UM-xxx) for details about the Media Engine use of Windows CE and application integration.

Operating System Installation

The Windows version of the Media Engine comes with the Windows® CE operating system already installed. A Certificate of Authenticity is included in the board package.

Registry Save Utility

The Media Engine provides an interface to save registry settings that are vital to system operation. The registry save utility saves information such as LAN Settings, Volume Level, LCD Brightness, and others. This utility is part of the shutdown sequence.

To initiate the Registry Save Utility

1. Select Shutdown in the Start Menu.

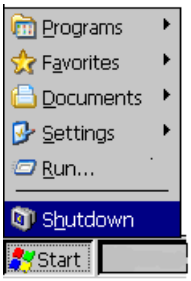


Figure 10 - Windows CE Start Menu

The Prepare system for shut down dialog box opens.

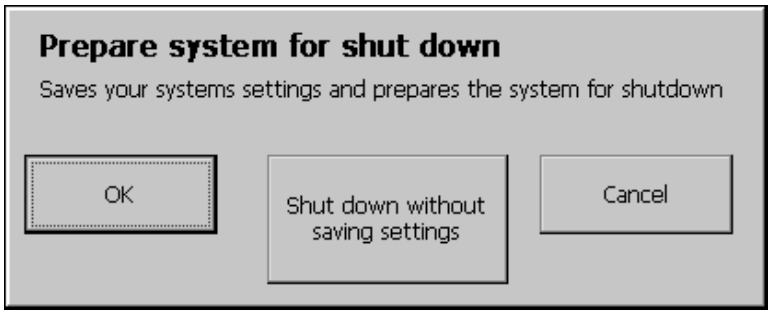

Prepare system for shut down
Saves your systems settings and prepares the system for shutdown
OK
Shut down without saving settings
Cancel

Figure 11 - Prepare System for Shut Down Dialog Box

This dialog box offers three choices.

2. Pressing the "OK" button executes a Registry Save and results in the message "It is now safe to turn off your computer." Note that this will save your current registry settings

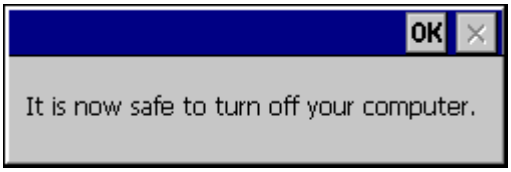


Figure 12 - It is now safe to turn off your computer

3. Pressing the "Shut down without saving settings" button will also result in the message "It is now safe to turn off your computer." Note that this will not save any new registry settings.
4. Pressing the "Cancel" button clears the screen and returns to the previous window.

Registry Clear Plug

A registry clear plug is provided in the Media Engine Development Kit. This plug is used to restore the operating system registry to the factory defaults. See the Media Engine Software User Manual for details of the use of the Registry Clear Plug.

Touch Panel Calibration

The Media Engine provides a touch panel calibration utility. This utility assists in aligning the touch panel's coordinates to the LCD.

To calibrate the Media Engine

1. Select Control Panel from the Start Menu.

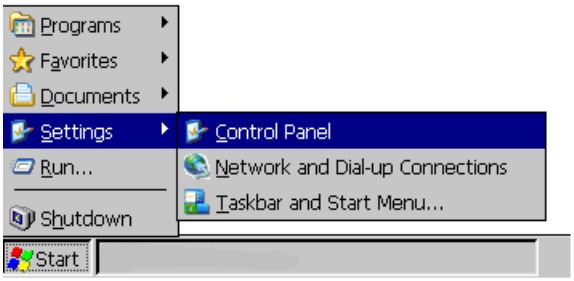


Figure 13 - Select Control Panel from the Start Menu

   The Control Panel opens.

2. Start the calibration utility by selecting the stylus icon on the Control Panel.
   The Stylus Properties Dialog box opens.
3. Select the Calibration tab.

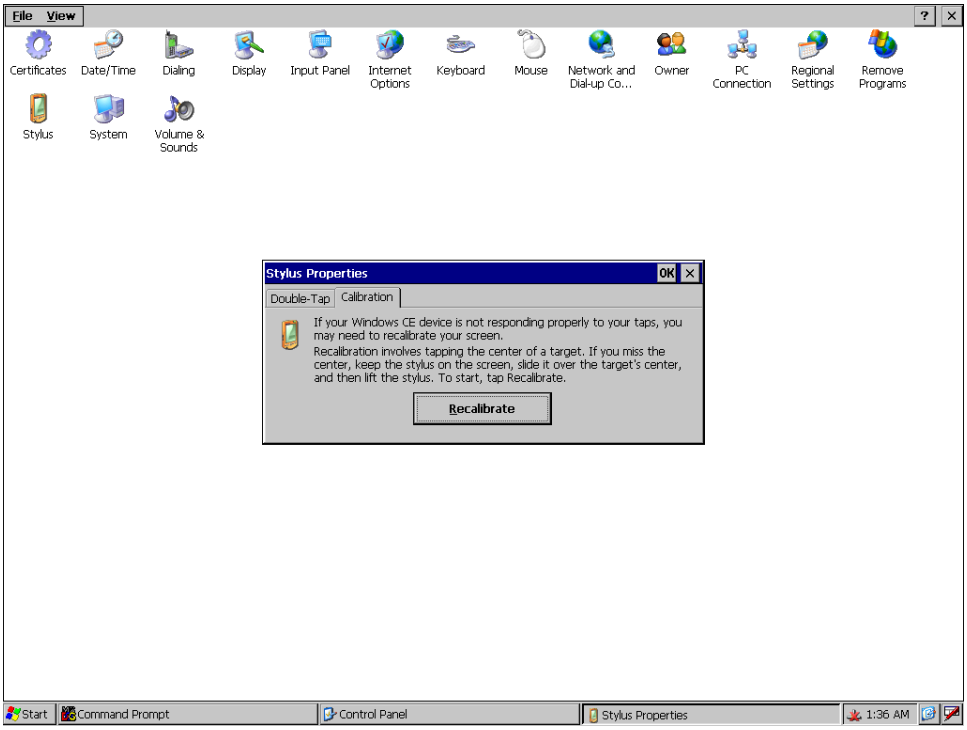


Figure 14 - Stylus Properties Dialog Box

4. Select the Recalibrate button to start the procedure.
   The calibration screen opens.

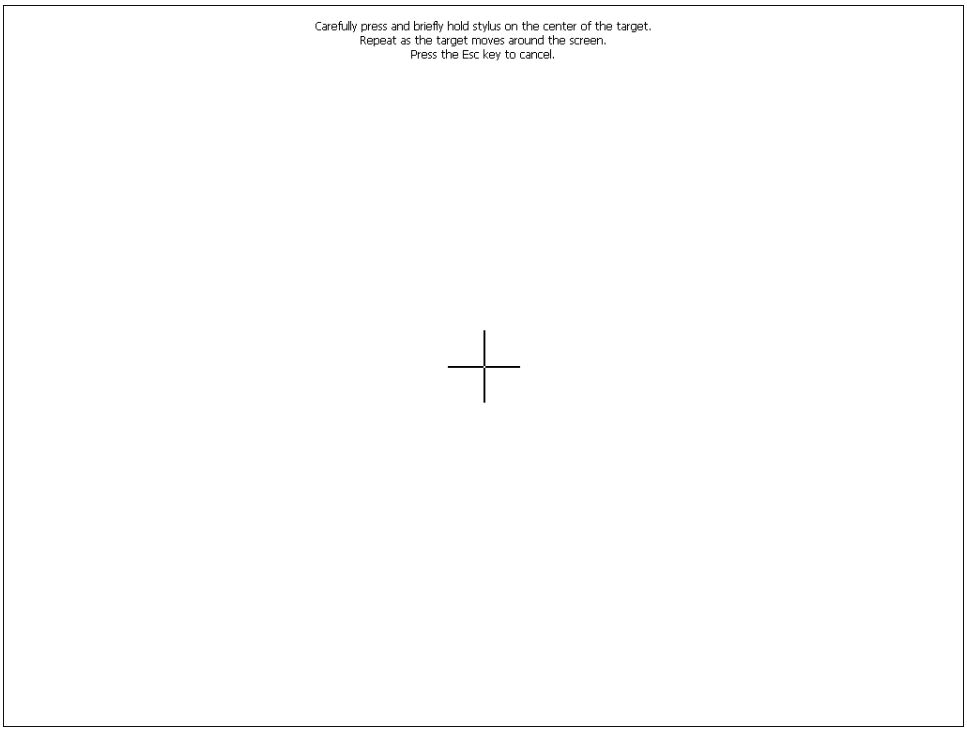

Carefully press and briefly hold stylus on the center of the target.
Repeat as the target moves around the screen.
Press the Esc key to cancel.

Figure 15 - Calibrate Screen

A blank screen with a cross opens.

5. Press and hold the stylus on the center of the cross until the cross moves to the next target position. Use a stylus instead of a finger.
6. Repeat this procedure for the five different locations.
7. When the calibration is successfully completed, the window closes.

A

Appendix A

List of Clock Frequencies

The table below shows the list of clock frequencies used internally by the Media Engine.

Element	Frequency
Crystal X2	13.000 MHz
Crystal	25.000 MHz
Crystal	24.576 MHz
Crystal	12.000 MHz
Crystal	32.768 KHz

Table 31 - Frequencies Used Internally by the Media Engine

Index

2700G 2, 3, 4, 15, 19, 22, 27, 29
AC Adapter.....3, 10, 11, 21
Audio 15, 16, 19, 22
Backlight Inverter 3, 10, 11, 22
Battery 15
Cache 15
CD 30, 31
COM1 .....19, 21, 31, 32
CompactFlash 4, 12, 16, 19, 22, 30
Configurations 10
Connectors2, 4, 10, 12, 17, 18, 19, 21, 22, 24, 25, 28, 29, 30, 31, 32, 33, 34
Design.....4, 10, 12
Development Kit.....3, 10
DRAM 3, 10, 15
Environment 10, 16
Environmental 2
Ethernet.....15, 19, 21, 26, 27
Flash 3, 4, 10, 15
GPIO.....12, 15, 19, 22, 33
Graphics.....3, 14, 15, 18, 19, 20, 22, 29
Headers 17
I²C.....4, 12, 15, 23, 32
Installation 4, 10, 35
Intel.....2, 3, 4, 15, 22
Interface 4, 10, 15, 16, 21, 22, 23, 26, 35
Inverter Cable 3, 10, 11
IrDA.....12, 19, 20, 32, 33
JTAG 16, 19, 21, 26
LCD ...2, 3, 10, 11, 15, 16, 19, 20, 22, 27, 28, 29, 30, 35, 36
LCD Inverter 16, 19, 27
LED 20
LVDS.....3, 10, 11, 15, 19, 22, 29, 30
Media Engine1, 2, 3, 4, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 35, 36, 39
Media Engine Development Kit 3, 10, 36
Memory 10, 15, 21, 22
MIC..... 19, 34
Microphone..... 16, 22, 34
Operation 20, 35
Part..... 3, 19, 35
Plug-N-Run..... 2
Power 3, 10, 11, 12, 16, 19, 20, 21, 22, 34
Power Cable..... 11
Power Supply..... 16
PXA270 ...3, 4, 12, 15, 16, 19, 20, 21, 26, 28, 29, 33
Real Time 15
Real Time Clock 15
Registry..... 3, 10, 35, 36
Registry Clear Plug..... 3, 10, 36
Registry Save Utility..... 35
Secure Digital 4, 12, 19, 21, 31
Serial.....12, 15, 20, 21, 22, 23, 32
Shut Down 35
Software.....2, 10, 12, 21, 35, 36
Speaker 10, 19, 22, 33, 34
Specification 4, 12, 15, 19, 21, 22, 23
Specifications.....2, 4, 10, 15, 16, 24, 26
SPI 4, 12, 15, 19, 23, 32
Stereo Speaker 3, 10, 16
Support..... 21, 22, 23
Switches..... 17, 20, 22
Touch Panel 3, 10, 11, 15, 16, 19, 21, 27, 36
USB 4, 12, 15, 19, 22, 34
Version.....2, 3, 12, 21, 22, 23, 35
Voltage..... 22, 34
Web Site 3
Windows CE..... 2, 3, 15, 35
XScale..... 2